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THE KENT INCORPORATED SOCIETY
FOR PROMOTING EXPERIMENTS IN
HORTICULTURE

ADMINISTRATIVE REPORT

(THIRTY-EIGHTH YEAR)

GENERAL DEVELOPMENT AND ACTIVITIES

EAST MALLING RESEARCH STATION

Near MAIDSTONE

KENT

1st October, 1949, to 30th September, 1950

Published April, 1951

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(Governing Members elected at the General Meeting, September, 1948)

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The Representative of the Staff Council:

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R. J. GARNER, Esq., N.D.H., Dip.Hort.Sci.(Reading). (*Appointed September*, 1950.)

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Captain R. WELLINGTON, M.C., Colescus, Gorran Haven, St. Austell, Cornwall.

STAFF

(1st October, 1950)

Director: F. R. Tubbs,* M.Sc.(Lond.), Ph.D.(Lond.), D.I.C., A.R.C.S., F.L.S.
Assistant to Director: T. N. Hoblyn,* Hort.Dip.(Wye).

Pomology:

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Miss I. Modlibowska, Ph.D.(Lond.).
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Assistants (Scientific):

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Miss J. Burton.
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Miss F. M. Hodges.
Miss M. Topley. (*Appointed April*, 1950.)
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Statistics:

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S. C. Pearce, Ph.D.(Lond.).
J. Taylor, M.A.(Cantab.). (*Resigned September*, 1950.)
Miss J. M. S. Thom, *Biometric Studies.* (*Resigned August*, 1950.)
G. F. W. Buckland, B.A., Dip.Agric.(Cantab.), *Biometric Studies.* (*Appointed September*, 1950.)

* Recognized Teacher of the University of London.
† Appointed under special grant from Agricultural Research Council.

Assistants (Scientific) :

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Miss L. V. Stickings. (*Appointed September*, 1950.)

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Assistants (Scientific) :

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Members of Staff of the Imperial College of Science and Technology working in collaboration with the Physiology Section :

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H. W. B. Barlow, B.Sc.(Edin.).
C. R. Hancock, B.Sc.(Bristol).
F. W. M. Llewelyn, B.Sc.(Lond.), A.R.C.S.

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W. R. Marchant.

Biochemistry: W. A. Roach,* D.Sc.(Lond.), A.R.C.S., D.I.C., A.R.I.C.
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S. G. Thompson, M.C., T.D., M.A.(Oxon).
A. C. Mason, B.Sc.(Lond.), F.R.I.C., *Physical Chemist.*
F. H. Vanstone, Ph.D.(Wales), A.Inst.P., *Physicist.*
A. E. Flood, M.A.(Cantab.), Ph.D.(Manc.), *Organic Chemist.*
H. J. Philcox.
Miss A. V. Delap, B.A., B.Sc.(Dublin), *Botanist.*
Miss E. M. Ford, B.Sc.(Lond.), A.R.C.S., *Assistant Botanist.* (*Appointed May*, 1950.)

Special Assistant :

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Assistants (Scientific) :

H. Hutchins.
Miss B. M. Kidwell.
Mrs. R. D. Souter (*née* Miss M. Saunders).
R. Neve.
E. C. Wills.
Miss F. M. Woolgar.
Miss S. M. Lloyd.
Miss A. J. White. (*Resigned July*, 1950.)
Miss M. M. Acott. (*Resigned July*, 1950.)
Miss C. M. Bennett. (*Resigned March*, 1950.)
Miss K. O. Strowgler. (*Appointed September*, 1950.)
Miss M. E. Jenner. (*Appointed October*, 1950.)
Miss E. M. Price. (*Appointed October*, 1950.)

Members of Staff of the Imperial College of Science and Technology working in collaboration with the Biochemistry Section :

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H. C. Ruck, B.Sc.Hort.(Reading).

Assistants (Scientific) :

Miss C. C. Macnamara.
Miss B. Milton.

Plant Pathology: R. V. Harris,* D.Sc.(Lond.), A.R.C.S., D.I.C.
M. H. Moore, M.Sc.(Reading), Ph.D.(Lond.), Dip.Hort.Sci. (Reading), *Plant Pathologist.*
W. G. Keyworth, Ph.D.(Lond.), A.R.C.S., D.I.C., *Plant Pathologist.*
A. F. Posnette, M.A.(Cantab.), A.I.C.T.A., *Virologist.*
J. Paine, B.Sc.(Lond.), A.R.C.S., A.I.C.T.A., *Virologist.*
J. E. Crosse, B.Sc.(Birmingham), *Mycologist and Bacteriologist.*
Miss M. Bennett, B.Sc.Hort.(Lond.), Dip.Hort.(Swanley), *Field Trials; also attached Entomology and Plant Protective Chemistry.*
P. J. Ormerod, B.A.Agric.(Cantab.), *Field Trials, Hops.*
A. Kozlowski, Ph.D.(Lwow), *Soilborne Diseases.*
Miss J. L. Smith, B.Sc.(Glasgow). (*Resigned January*, 1950.)
D. S. Kirkham, B.Sc.(Lond.), *Bio-assay of Fungicides, attached to Plant Protective Chemistry.*
Miss P. M. Goode, B.Sc.Agric.(Dunelm).
R. Cropley, Dip.Hort.(Reading).†
P. W. Talboys, B.Sc.(Lond.), Ph.D.(Lond.), D.I.C. (*Appointed February*, 1950.)

Assistants (Scientific):
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Miss B. I. Fleet.
Miss M. M. Joyce.
Miss S. Squires.

Entomology: A. M. Massee,* D.Sc.(Lond.), F.R.E.S.
G. H. L. Dicker, Ph.D.(Lond.), A.R.C.S.
M. D. Austin, F.R.E.S., *Red Spider Investigations in Essex.*
R. S. Pitcher, Ph.D.(Lond.), Dip.Agric.(Wye), Dip.Ento.(Wye), *Eelworm and Gall Midges.*
K. S. McKinlay, B.Sc.(Lond.), *Bio-assay of Insecticides attached to Plant Protective Chemistry.* (*Resigned July*, 1950.)
Miss D. E. Griffin, B.Sc.(Lond.), A.R.C.S., *Bio-assay of Insecticides attached to Plant Protective Chemistry.* (*Appointed September*, 1950.)
Miss E. M. Collyer, Ph.D.(Lond.), *Beneficial Insects of Fruit.*
Miss J. R. Groves, B.Sc.Hort.(Reading), *Codling Moth.*
J. B. Briggs, B.Sc.Hort.(Reading). (*Appointed October*, 1949.)

Assistants (Scientific):
E. F. Souter.
Miss H. May. (*Resigned September*, 1950.)
Miss S. O. Philcox. (*Appointed September*, 1950.)

Plant Protective Chemistry: A. H. M. Kirby, M.Sc.(Lond.), Ph.D.(Lond.), A.R.I.C.
Miss B. S. Winton, B.A.(Cantab.). (*Resigned January*, 1950.)
M. Allen, B.Sc.(Lond.).
R. G. Gambrill.

Miss V. P. J. CLARKE, B.Sc.(Lond.). (*Appointed November, 1949. Resigned March, 1950.*)
E. L. FRICK, B.Sc.Agric.(Wales). (*Appointed April, 1950.*)
L. J. PULESTON. (*Resigned July, 1950.*)
Miss W. M. PHILLIPS. (*Appointed September, 1950.*)

For Biological Assistants, see D. S. KIRKHAM, *Plant Pathology*, K. S. MCKINLAY *and* Miss D. E. GRIFFIN, *Entomology Sections.*

Assistants (Scientific):

Miss V. M. DREW.
P. ABERY. (*Resigned September, 1949.*)
S. R. B. SOLLY. (*Appointed November, 1949.*)
Miss J. I. BRACKENBURY. (*Appointed April, 1950.*)
Miss J. RICHARDSON. (*Appointed October, 1950.*)

Scottish Raspberry Investigation: *Headquarters—University College, Dundee.*
R. V. HARRIS,* *Head of Investigation.*
C. H. CADMAN, B.Sc.(Liv.), Ph.D.(Edin.), F.R.S.E.,† *Plant Pathologist. (In charge.)*
C. A. WOOD, Ph.D.(Wales),† *Pomologist.*
R. J. ROSE.†

Clerical Assistant:

Mrs. A. S. COULL,† *Part-time.*

Assistants (Scientific):

R. W. REID.†
H. A. BISSETT.† (*Resigned February, 1950.*)
P. H. RACIONZER.†

Scientific Liaison: H. B. S. MONTGOMERY, B.A.(Dublin), Ph.D.(Lond.), D.I.C.
A. C. PAINTER, O.B.E.
J. H. WALKER, B.Sc.Agric.(Reading).
E. G. COKER, B.Sc.Hort.(Lond.). (*Appointed January, 1950.*)

Clerical Assistant:

Miss M. E. EMM.

Assistants (Scientific):

Miss S. D. J. HUMPHREYS. (*Resigned December, 1949.*)
Miss J. C. IRVING. (*Appointed January, 1950.*)

Meteorological Records: A. P. PRESTON.
G. F. TROWELL.

Librarian: S. R. BALL, B.A.(Lond.), F.L.A.

Photographer: E. YOXALL JONES.

FARM STAFF.

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Assistant Plantations Officer: Miss B. F. SEYMOUR.

Experimental Nurseries: T. V. DIXON.

Experimental Greenhouses: M. M. MACNEILL, B.Sc.Hort.(Wye). (*Appointed July,* 1950.)
A. TIDY.

Workshops: G. WELLER.
K. W. G. BUNYARD. *Laboratory Instrument Mechanic.*

ADMINISTRATION.

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Assistant to the Secretary: T. R. LITTLEHALES. (*Appointed January,* 1950.)

Book-keeper: P. R. WOOD.

Director's Personal Secretary: Miss L. M. READ.

Clerical Staff: Miss J. M. COY, Miss L. MIDGLEY (*Resigned August,* 1950), Miss J. D. MARTIN, Miss J. M. PARSONS, Miss L. SHERRATT, Miss P. M. RAYFIELD, Miss R. M. WICKHAM, Miss I. CROSS, Mrs. F. J. FITNESS, Miss D. M. ANSELL, Miss M. E. Wedgbury, Miss P. H. WESTACOTT, Miss D. A. JESSUP (*Resigned January,* 1950), Miss M. V. RELF (*Resigned April,* 1950), Miss D. CLEGG (*Appointed January,* 1950), Miss I. BELL (*Appointed April,* 1950), Miss P. RAYFIELD (*Appointed June,* 1950), Miss J. BATES (*Appointed July,* 1950), Miss K. D. APPS (*Appointed August,* 1950).

VISITORS.

Tours of the Station are arranged by appointment on Tuesday and Thursday afternoons. Visitors with special interests are received by appointment on the mornings of these days and may then join the general tour later if they wish. Wednesdays and Fridays are reserved for visiting research workers who also should make an appointment to ensure that a useful programme for the visit can be prepared.

All visitors wishing to see the work of the Station should go to the Enquiry Office at the Research Laboratories.

Visitors coming by road should take the turning to East Malling, opposite "The Bull", Larkfield, on the main London-Maidstone road. The entrance gate to the Research Station is on the left, opposite the "King and Queen" in East Malling.

Bus Service: From Maidstone by the Maidstone and District Motor Services Limited, every 20 minutes from Maidstone to East Malling.

Passenger Station: EAST MALLING HALT (British Railways, Southern Region).

Goods Station: AYLESFORD (British Railways, Southern Region).

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THE COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

Accommodated at Bradbourne, the Administrative Headquarters of the East Malling Research Station.

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Consultant Director: F. R. TUBBS, M.Sc.(Lond.), Ph.D.(Lond.), D.I.C., A.R.C.S., F.L.S.

Assistant Director: A. G. G. HILL, B.A., Agr.B.(Dublin), B.Sc.(N.U.I.), A.R.C.Sc.(I). (*Resigned November*, 1949.)
G. K. ARGLES, Dip.Hort.(Wye), A.I.C.T.A. (*Appointed March*, 1950.)

Assistants: H. WORMALD, D.Sc.(Lond.), A.R.C.S., D.I.C.
V. H. GOLDSCHMIDT, Ph.D.
Miss P. J. ROWE-DUTTON, B.Sc.Hort.(Lond.).
Mrs. E. ULYATT, Dip.Hort.(Eisgrub.) (*Appointed May*, 1950.)

Clerical Staff: Miss M. B. ROGERS, Miss M. M. DURLING, Miss J. E. MORRISON.

NATIONAL AGRICULTURAL ADVISORY SERVICE

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PROVINCIAL ADVISORY OFFICER—FRUIT, SOUTH-EASTERN PROVINCE
W. G. KENT, N.D.H.

Clerical Assistant: MRS. D. B. DUPUY. (*Resigned September*, 1950.)

GENERAL DEVELOPMENT AND ACTIVITIES

Introductory.

This Thirty-eighth Report of the Executive Committee on the general activities of the Station records a year of steady progress. There have been no changes in the senior research and administrative staff and the Committee would express its appreciation of the work accomplished, which is evidenced by the sixty-two papers published during the year 1949-50 and the thirty-six papers in the forthcoming Research Report. Incidentally, much hard work has gone towards the earlier publication of these Reports and the Committee would thank all concerned for the efforts that have been made.

Our cordial relations with the Agricultural Research Council and the Ministry of Agriculture have been maintained and it was a particular pleasure to welcome Dr. W. K. Slater, Secretary of the Council, who spent two days with us in March. It was with regret that we learnt that Mr. E. H. E. Havelock, Administrative Secretary to the Council for many years would, after 1st March, devote his time solely to the affairs of the Development Commission ; and that Mr. W. R. Black of the Ministry's Research Branch would be retiring in May. Throughout the many changes and developments of the last ten years, the Station has had the closest and most friendly relations with these two representatives of the Council and the Ministry respectively, and we should like to record here how much we have valued their good offices on our behalf.

During the year the Committee's plans to provide for the housing of members of staff have approached fulfilment, thanks largely to the financial help rendered by the East Malling Association. Efforts must now be concentrated on the plans to ease the congestion in the laboratories, on which we hope to report further next year.

For the fifth successive year we are able to report good fruit crops on the experimental farm. However, we should make it clear that, quite apart from disasters, such as happened in 1935, as the result of a late spring frost, with the intensification of research it is unlikely in the coming years that our " sales of produce " will be able to carry the now very heavy cost of running an experimental farm, as they have done in the past few years.

Governing Members.

As usual, arrangements were made for a special day in the summer on which Governing Members were given an opportunity to see and discuss the details of one or two selected items of the research programme. This year, at the suggestion of Professor Brown, an invitation was extended to the Scientific Members of the Governing Body to visit the Station for two days in May. Several accepted the invitation and took occasion to pay rather longer visits to the laboratories and field experiments than is usually possible and discuss the problems of their work with individual research workers. We hope this will be the first of many such occasions.

A portrait of our Chairman, Mr. T. Neame, painted by the late Mr. E. Swan, has been completed and now hangs in the Secretary's office.

As reported later, Mr. R. J. Garner was nominated as Staff Representative on the Governing Body, to succeed Dr. W. G. Keyworth, and took office at the Annual General Meeting in September, 1950.

Committees.

The *Executive Committee* (Chairman, Mr. T. Neame), and the *Finance Sub-Committee* (Chairman, Mr. J. W. S. Mount) held their customary quarterly meetings, and dealt with the routine business of the Station. The *Building and Staff Accommodation Sub-Committee* (Chairman, Mr. J. F. Towner) met in January and approved a five-year works maintenance programme for submission to the Executive Committee. The *Plant Prices Sub-Committee* (Chairman, Mr. W. Talbot Edmonds) met in July, and dealt with the distribution and prices for surplus experimental material in 1950-51. The *Farming Sub-Committee* (Chairman, Mr. Owen English) met in November. A small *ad hoc* Sub-Committee was appointed in June to advise the Director on matters concerning the proposed extensions to the laboratories.

The following were the main subjects dealt with by the Committees.

Presentations to Sir Ronald Hatton.

In April, the Chairman, the Director and the Secretary visited Sir Ronald and Lady Hatton and presented to them informally a suitably bound and inscribed volume containing the names of all those who had contributed to the presentation.

Later, the Staff Representative, accompanied by Miss E. C. Thompson and Miss E. M. Glenn, also visited Hythe taking with them a second volume, with illuminated letter headings, containing the signatures of all past and present members of staff and postgraduate students who had subscribed towards the greenhouse which had been duly delivered and erected in Sir Ronald's garden earlier in the year. Members who remember his delightful account of his fruit garden at Great East in the R.H.S. Journal will be interested to learn that Sir Ronald is even now planting a fruit garden, which looks like being a model of what can be done in a really small space.

It is a source of pleasure to the Committee that Sir Ronald has accepted an invitation to become an Honorary Fellow of the East Malling Association.

Laboratory Accommodation.

During the year the Ministry of Agriculture has made a grant to enable some of the plans envisaged last year for the maximum possible use of our existing buildings to be put into effect. The old kitchen in the E.M.B. Building is being converted into an organic chemistry laboratory to accommodate Dr. Bradfield and his assistants, and various alterations are in progress in the Pomology laboratory and in the Manwaring Building. It is expected that these will be completed by the end of 1950.

In the meantime, some further progress has been made towards the provision of most urgently needed extensions of the buildings. We are glad to report that this need is appreciated by the Agricultural Research Council and, with the approval of the Ministry, a firm of architects, Messrs. Lanchester and Lodge, has been commissioned to draw up draft plans to meet the most urgent requirements and these have been submitted to the Council and the Ministry for approval in principle.

Experimental Greenhouses.

The hope that the two new glasshouses, especially designed for virus research, would be completed in time for the 1950 season's work was not realized and we were only able to use a small part of the west house. Even by the end of September the two houses and installations were not yet completed. It is hoped, however, that the work will be finished by the end of November and the final testing of the boilers and other equipment carried out, so that the virus team can use the houses fully during 1951. This will release glasshouse space urgently needed by other Sections, especially Plant Physiology and Plant Protective Chemistry.

With the aid of a special grant, the old propagation house, originally erected in 1923, the timber work of which was in a bad state of disrepair, has been rebuilt in time for use again in the winter 1950-51.

Three "dedutchable" houses have been provided by the Festival of Britain authorities to house plant material being raised specially for a joint exhibit put up by Long Ashton, John Innes and ourselves. Demonstrations will be staged in London during the whole period of the Festival.

The developments outlined above will, when complete, practically double the area under glass. The new arrangements that have been made for the management of this very considerable part of our activities are detailed later in this Report under the heading of "Staff".

The Experimental Farm.

We have already commented upon the increasing congestion in the laboratories and the steps that are being taken to alleviate it. But only a small part of our work is carried out indoors and, as the research expands, so there is an ever increasing demand for land. The Committee has, therefore, reviewed the utilization of the land at present available in the light of developments likely to take place in the future.

Since the Bradbourne estate was taken over the farm has nominally consisted of 360 acres; but of this rather over 50 acres are absorbed by buildings and their surrounds, roads, gardens and recreation ground, arboretum, woodland and ornamental water. In some instances, e.g. the demonstration fruit garden and the lake, these amenities are profitably adapted for research, but the area available to the farm is reduced. Further, about 90 acres cannot be planted with fruit, because they are too liable to spring frosts, the soil is unsuitable or we are bound by agreement with the National Trust not to plant with trees. Some of this land can be used for nurseries, small scale laboratory trials, where fruit is not required, and so on, but it must mainly be used for arable crops and cannot be planted as orchards or with small fruits.

In 1950, of the remaining 210 acres, about half were planted with fruit trees; there were 25 acres of fruit tree nurseries, including stoolbeds, and 35 acres under small scale laboratory trials (a big increase in recent years), leaving rather less than 50 acres under arable crops in preparation for future fruit plantings.

By 1955 practically all this open land will have been planted up, and it may be noted that quite a large part of the new plantations will be intensively used for the increasingly important small scale experiments, many of which cannot be expected to produce profitable fruit crops.

The Committee is, therefore, faced with the alternative of seeking new land or clearing existing plantations which, although they yield well, are no longer experimentally

worthwhile. The former course, in this fully developed neighbourhood, is fraught with many difficulties and it has, therefore, become urgent to proceed vigorously with the grubbing programme started a few years ago, so as to allow time for the land so cleared to recover its fertility and uniformity for future trials. Measures outlined in the Research Report to speed up this process have been initiated ; but this policy is bound to affect for some time to come the production of marketable fruit and thus the financial return from the farm (see p. 17).

This season a great improvement has been effected in the grading, packing and marketing of our fruit, and the result has been very favourably commented on in the markets.

A new cold storage chamber has been built in time to store part of the season's crop ; this will compensate the farm for the storage space released two years ago for frost damage investigations.

Upkeep of Grounds, Roads, etc.

As shown above there is now quite a large non-productive area, that would not be needed on a commercial farm, but which is essential on a Research Station with a large staff and some 3,000 visitors a year. Communications, for example, must be good and we now have some two miles of tarmac or concreted road to keep up, apart from another four miles of farm road, much of which is metalled. In addition there are the surroundings to the buildings, arboretum and quite a large area of lawns around Bradbourne, which is invaluable for summer gatherings. All these must be kept in good order, the heavy cost of which, apart from occasional special grants for road repairs, has hitherto fallen on the farm. This has now been remedied by the Ministry, who have for the first time made an annual grant for the maintenance of the grounds.

Apart from this there have been several additions to the amenities of the estate that have been financed from other sources. The old approach to the laboratories from the village green, East Malling, has been closed and a new one built directly on the Larkfield-East Malling road just beyond the new staff houses. It is hoped to provide wrought iron gates for the new entrance in the near future. Part of the grant from the Association for staff recreation is devoted to the upkeep of the cricket ground. The lawns around Bradbourne have been re-sown and the grass is now well established. Daffodil bulbs given us by Mrs. E. Snell have been planted near the shrubberies. It is appropriate that the Station should possess specimens of the oldest group of plants still represented by a living species and we are indebted to Sir Edward Salisbury for two young trees of *Metasequoia glyptostroboides*, which have been planted at Bradbourne. Finally, we should record that the lake has been re-stocked with trout.

Staff Accommodation.

The problem of housing the staff of this growing Station that has exercised the mind of the Committee since the end of the war, is slowly being solved. In addition to Great East, eighteen cottages belonging to the Station are occupied by married members of the farm staff. By the end of 1950, it is anticipated that the eight new staff houses, now named Church Fields, will be completed, by which time the Director and sixteen married members of the research staff, the majority of whom have joined us since

1945, will be accommodated. Lastly, at the Grange, which has been full throughout the year, it is possible to house from twelve to fourteen junior unmarried staff and post-graduate students.

Considering the paucity of houses five years ago this is a notable achievement. The building of twelve farm cottages was financed, it will be remembered, from the surplus from the experimental farm accumulated in the years of good crops and high prices during the war. The remainder of these developments, although materially assisted by the Ministry, have been made possible mainly through the efforts of the Membership Association. How beneficial they are to the Station as a whole is now becoming apparent.

Maintenance of Buildings.

From the above it is clear that the Station is now responsible not only for the various buildings required for administration, research and the experimental farm, but also for some thirty-five dwelling houses. The problem of maintaining these numerous buildings is a very real one in view of the acute shortage of building labour. To facilitate this the workshop staff has been considerably augmented and it has thus been possible to proceed with many repairs to buildings and other work which might otherwise have been impossible.

So that maintenance work may proceed in an orderly manner, the Chairman of the Building and Staff Accommodation Sub-Committee, Mr. Towner, with the Director and Farm Supervisor inspected every building belonging to the estate early in the year and prepared a schedule of painting, repairs and renewals for the next five years and these are being carried out, either with our own staff or, where the undertaking is too large for us, by contract.

In Bradbourne house, the work started last year has been continued. Several more rooms have been redecorated and structural repairs executed where needed. In the process, interesting information about the internal structure of the house has been revealed.

We have to acknowledge the invaluable advice given us by Mr. Hope Bagenal in solving a difficult problem of acoustics in the staff canteen. Members who have lunched there on recent Open Days will have noted the decided improvement that has been effected by the judicious placing of Acousti-celotex tiles.

Twisden Cottage has been repaired and modernized. The roof of the Grange has been retiled and most of the rooms within the house redecorated. The programme for external painting for 1950 has been carried out. All these are additional to the innumerable small day to day maintenance tasks which are necessary on an estate of this size and complexity.

Administrative Staff Salaries.

The long-awaited salary grades for the administrative staff were received during the year. While there are some improvements on those formerly ruling, we have to bear in mind that it has been our policy to run the clerical side of the work here with a comparatively small, but highly skilled staff. The new grades do not make it any easier to compete with industry for the services of girls with the right kind of ability to carry out the very varied and often specialized work in this way.

Annual General Meeting.

The Annual General Meeting was held at Bradbourne on Tuesday, 26th September, 1950, under the Chairmanship of Mr. T. Neame.

Dr. F. R. Tubbs presented the Annual Reports for the nine months January to September, 1949, and surveyed the work which had been undertaken during that period. He noted that the Reports would in future cover the same period (October to September) as the Accounts. On the proposition of Professor V. H. Blackman, seconded by Captain R. Wellington, the Annual Reports for 1949 were adopted. In his remarks, Captain Wellington stressed the value of the East Malling Research Station Association, and emphasized that without a Membership Fund, many developments of past years would have been impossible, and that the contribution from the Fund to the improvement in staff housing and other amenities helped very materially to increase the efficiency of the research.

The Balance Sheet and Accounts for the year ending 30th September, 1949, were presented by the Finance Chairman, Mr. J. W. S. Mount. He referred to the loss of some £6,692 on the Plantation Trading Account, due to the increase in wages and a reduction of some £9,213 in the sales of produce. Sir Edward Hardy moved the adoption of the Accounts, and endorsing Captain Wellington's observations, hoped that all fruit-growers would take an interest in the Association, and so maintain that personal contact with the work at East Malling which had proved of great value. Mr. Alfred Day seconded the adoption of the Accounts and, on behalf of the growers, congratulated the Finance Chairman on the report he had placed before the meeting. The Balance Sheet and Accounts for the year ending 30th September, 1949, were then unanimously adopted.

The re-election of the auditors, Messrs. J. Dix Lewis, Cæsar Duncan & Co., for the ensuing year was proposed by Mr. L. J. Cook, seconded by Mr. B. S. Furneaux, and carried unanimously.

This year an invitation to attend was extended to all Members of the Association.

FINANCE.

Summaries of the Expenditure and Receipts of the Research Account and the Special Grants, together with the Experimental Farm Accounts, are appended, and cover the year from 1st October, 1949, to 30th September, 1950.

The Research Account.

The contribution of £1,403 from the E.M.R.S. Association's funds towards Research expenditure will be noted, together with the grant from the Ministry of £2,000 as a contribution towards the upkeep of the grounds and essential services, already remarked on. The special accounts do not call for comment, except that the Hop Diseases Investigations income and expenditure is included in the main Research Account as from 1st October, 1949, and not shown under a separate heading.

The Farm Account.

The total expenditure of £45,288 is rather less than in 1948-49. This is in itself something of an achievement in these days of expanding research projects, including

many intensive trials highly expensive in labour, and continually rising costs. The total labour cost has actually been reduced by some £2,000 compared with last year and this reduction was only partly due to the saving in the wages of casual hop-picking labour as a result of the removal of the hop cultural work to Wye College and the consequent clearing of a large part of our hop gardens.

However, it was evident early in the year that the receipts from sales of produce could not be expected to cover the heavy expenditure; since not only was the farm beginning to feel the results of the grubbing policy, already explained, but the marked fall in the prices and demand for nursery material gave some forewarning of the prices to be expected for fruit; the Ministry was, therefore, informed accordingly. The forecast was only too correct and, despite an excellent crop of first-class quality fruit from the remaining plantations, the steep fall in prices reduced our total sales of produce to £26,629, about £5,400 less than last year. Every grower will appreciate fully the various forces at work. In the result the farm showed a deficit of £9,944, which will be met by the Ministry. It should be emphasized that this should not be regarded as a loss, as in a commercial undertaking, but rather as the cost of running the experimental farm of 300 acres, only one-third of which is in productive fruit.

The East Malling Research Station Association.

There is no need to inform Members again how much we value their close interest in and support of the Station. There have been several instances, detailed below, of the invaluable developments which their contributions have made possible. In return, at the cost of about 12s. 6d. a head, Members receive the Annual Report, in this year an up-to-date revision of the Spray Calendar, the privilege of attending and taking part in demonstrations and discussions on Open Days and the opportunity to purchase a share of surplus experimental material. It was decided this year to bring the objects and advantages of the Association to a wider circle of fruit-growers and, to this end, with the co-operation of the N.F.U., an explanatory leaflet was widely circulated. The resulting increase of about 100 new Members, bringing the total to 2,102 Fellows and Members at the end of September, though not large, is valuable and we hope the numbers will be further added to in 1950-51.

A summary of the accounts of the Association is given below. The two largest items of expenditure, apart from the running expenses of the scheme, are the grant of £1,403 to the Research Account and the first contribution of £2,830 towards the eight staff houses. In addition, the Association paid a substantial part of the cost of retiling the roof of the Grange, and made a grant of £250 towards staff recreations. An account of how this was expended is given later in this Report. A small item, but one which can be paid from no other source, is the assistance given to junior staff attending night school.

Towards these outgoings, subscriptions this year amounted to £4,456, so that last year's bank overdraft was increased to £3,665. This is, however, amply covered by the Association's investments and freehold properties, the capital value of which is shown below, together with the small Rentals Account. The balance in this account is accumulated against necessary repairs or improvements to these properties.

Research Account.

1st October, 1949, to 30th September, 1950.

Expenditure.	£	s.	d.	Income.	£	s.	d.
Salaries, National Insurance and Superannuation ..	66,643	18	6	Grant from Ministry of Agriculture	85,531	19	8
Laboratory Expenses and Equipment	7,318	9	6	Contribution from East Malling Association	1,403	0	0
General Maintenance Expenses	11,730	16	1	Festival of Britain (Greenhouses)	480	3	0
Frost Damage Investigations	100	14	2	Sundry Receipts	929	9	2
Festival of Britain (Greenhouses)	480	3	0				
Balance, being excess of Income over Expenditure	2,070	10	7				
	£88,344	11	10		£88,344	11	10

Supplementary Accounts.

Special Grants from the Agricultural Research Council.

Expenditure.	£	s.	d.	Income.	£	s.	d.
Balance brought forward, 30th September, 1949	142	13	10				
Biennial Bearing in Fruit Trees Investigation	537	9	0	Biennial Bearing in Fruit Trees Investigation	445	15	1
Raspberry Investigation in Scotland	4,313	15	8	Raspberry Investigation in Scotland	2,303	0	0
Pettar Ace Red Spider Investigations	636	5	4	Pettar Ace Red Spider Investigations	3,127	5	11
Raspberry Cane Midge Investigation	39	8	4	Raspberry Cane Midge Investigation	39	8	4
Balance carried forward ..	245	17	2				
	£5,915	9	4		£5,915	9	4

Experimental Farm Account.

1st October, 1949, to 30th September, 1950.

Expenditure.	£	s.	d.	Income.	£	s.	d.
Farm Wages	26,273	10	11	Sale of Produce and Crops ..	28,629	3	5
Farm Manures and Sprays ..	3,163	15	5	Sale of Livestock	2,015	6	8
Livestock	1,817	8	2	Grant for Irrigation Scheme ..	226	0	0
Park Farm House Repairs ..	1,979	16	0	Grant for Park Farm House Repairs	1,979	16	0
Irrigation Scheme	226	0	0	Sundry Receipts	2,493	16	0
General Farm Expenses, Implements and Repairs ..	11,827	12	8	Balance being Excess of Expenditure over Income ..	9,944	1	1
	£45,288	3	2		£45,288	3	2

The East Malling Association Income and Expenditure Account.

1st October, 1949, to 30th September, 1950.

Expenditure.	£ s. d.	Income.	£ s. d.
Bank Overdraft, 30th September, 1949	1,970 16 0	Subscriptions and Donations ..	4,456 4 5
Research Grant	1,403 0 0	Sale of Leaflets	1 4 11
Evening Class Fees	3 12 0	Interest on Investments ..	143 0 0
General Expenses	1,268 4 0	Bank Overdraft, 30th September, 1950	3,665 5 10
Staff Recreation	250 0 0		
Sundry Grants :			
Staff Houses	2,830 3 2		
Grange	540 0 0		
	£8,265 15 2		£8,265 15 2

Investments and Freehold Properties held by the Association

at 30th September, 1950.

	£ s. d.	£ s. d.
Investments at Cost :		
£2,000—2½% National War Bonds ..		2,000 0 0
£3,720—2½% Consols		3,000 0 0
Freehold Properties at Cost :		
" Fircroft ", Larkfield	2,577 16 5	
" Grange ", East Malling	6,214 17 2	
31, Buckland Lane, Maidstone ..	2,567 1 2	
59, Grace Avenue, Maidstone ..	2,299 6 0	
		13,659 0 9
		£18,659 0 9

Association Rentals Account.

1st October, 1949, to 30th September, 1950.

Expenditure.	£ s. d.	Income.	£ s. d.
Rates, Schedule " A " Tax, Repairs, etc.	88 11 0	Cash at Bank, 30th September, 1949	105 1 0
Cash at Bank, 30th September, 1950	277 3 0	Rents	260 13 0
	£365 14 0		£365 14 0

Members' Days.

Four Days for Members and Associates were held during the year, including that on which the Annual General Meeting was held, and in addition a short programme of research talks for them was organized to precede the Amos Memorial lecture in October, 1949.

The first Day was held on 7th February, when research on growth substances was discussed. The morning was spent in considering the part played by growth substances in vegetative propagation, especially by cuttings, and the afternoon was devoted to the prevention of fruit drop. Some 140 Members attended this meeting.

The next Day, held on 3rd May, consisted of tours of the experiments on cover crops and biennial bearing. As the attendance was about 250, two parties were formed. The talks on this Day and the two following were delivered through loud-speakers to ensure that everyone could hear.

A morning on soft fruits was held on the 29th June, to precede the Members' Cricket Match in the afternoon. The tour and talks covered strawberry cultural and variety trials, virus diseases and eelworm, raspberry breeding and cane midge. Some 100 Members attended.

On the afternoon of the Annual General Meeting, a programme of talks in the plantations was arranged on the subjects of codling moth, brown rot and walnut varieties. In spite of cold, showery weather the attendance numbered 250 Members.

It is, of course, most gratifying to have our Members' Days well attended and large numbers create no difficulties so long as the programme can be carried through in the plantations. There is, however, still no suitable building available at present where more than 200 Members can be comfortably seated.

A special programme was arranged for the annual visit of the Governing Members, when the new research projects on the restoration of uniformity of land from which fruit trees have recently been grubbed and on dwarfing cherry rootstocks were discussed. The attendance on this occasion was low, but was partly compensated for by a special two-day visit of the Scientific Members of the Governing Body, which provided an opportunity for personal discussion with individual members of staff on most of the lines of work in progress. These contacts with the Governing Members are of great value.

Amos Memorial Lecture.

A sum of £41 is still needed to bring the capital in this fund up to the £500 originally aimed at. The fee we are able to offer lecturers is still very small, so that further donations to the fund will be welcome.

The second lecture, entitled " The Soil and the Fruit Tree ", was delivered by Mr. B. S. Furneaux at Bradbourne on 18th October, 1949. An audience of some 280 fruit-growers and scientists attended, and the lengthy discussion which ensued gave evidence of the interest aroused. The text of the lecture was published in the Annual Report for 1949. It is intended that the third lecture of this series shall, by kind permission of the Principal, be held at Wye College, where Jesse Amos started his career.

Staff.

The Staff Council met quarterly as usual. Owing to his approaching departure for the United States, where he will be spending a year at The Agricultural Experiment Station, Newhaven, Connecticut, Dr. W. G. Keyworth did not offer himself for re-election

and Mr. R. J. Garner was elected as Staff Representative on the Governing Body, taking office at the Annual General Meeting in September, 1950.

During the year under review, there have been no changes in the senior staff of the Station, but several new appointments to the assistant research staff and rather many changes among the assistants (scientific).

The Director was recognized in February by London University as a Teacher of Applied Botany.

The Pomology Section has been augmented by two appointments; Miss M. J. Taylor came in November, 1949, to assist with raspberry breeding (it will be recalled that Mr. N. H. Grubb is staying on to continue this work on a part-time basis); also, it has now been possible to give Mr. Greenham some assistance with his studies on orchard soil maintenance, for which purpose Mr. J. E. Goode joined the Section in July. His appointment, together with the alterations which have been completed in the Pomology laboratory will enable the work on soil structure, organic matter, etc., to be expanded. Miss N. Wallick, who has been assisting temporarily in the frost investigation since April, 1949, returned to Canada with our good wishes in July, and Mr. J. P. Ruxton, who has had research experience in cell metabolism, joined the small team working on this investigation in September.

The Statistical Section has suffered a severe blow in the loss of both Miss J. M. S. Thom and Mr. J. Taylor. Miss Thom has been for five years in charge of records, during which time she has also made herself proficient in methods of statistical analysis, obtaining the Certificate of the Royal Statistical Society this year. She left us in August to be married and takes with her the good wishes, not only of the Section, but of many others to whom she has given her services unstintedly. Mr. Taylor came to us in October, 1946, since when numerous members of staff and postgraduate students have cause to thank him for his help in their statistical problems; what was perhaps not so apparent, except to a few, was his unobtrusive service to his colleagues on the Canteen Advisory Committee. He has now left England to take up a post with the Research Division of the Ministry of Agriculture and Forests, Sudan. In September, we welcomed Mr. G. F. W. Buckland, who will be associated particularly with problems of tree measurement and other field studies in the Section's programme.

Miss E. M. Ford joined the Biochemistry Section in May to assist in botanical studies. Miss Ford has had four years' previous experience with the Section and now returns after having taken her degree at the Imperial College; we are glad to see her back.

Miss J. L. Smith resigned from the Pathology Section in January to take up an appointment in Zanzibar under the Colonial Office as assistant in the Cloves Research Scheme. She was succeeded in the following month by Dr. P. W. Talboys, who had just completed a postgraduate research course at the Imperial College under Professor W. Brown, for which he was awarded the degree of Ph.D. by London University. The subject of his thesis was a study of enzymic mechanism of certain plant pathogens.

Mr. J. B. Briggs was appointed in October, 1949, as assistant in the Entomology Section.

Mr. K. S. McKinlay, entomologist attached to the Plant Protective Chemistry Section, left at the end of July on accepting a post with the Colonial Insecticide Committee and we may add that he has now sailed for E. Africa. Mr. McKinlay was succeeded by Miss D. E. Griffin, who came from the Imperial College in September. This is unfortunately not the only staff change that has affected the Plant Protective Chemistry Section. Miss B. S. Winton, organic chemist, was granted special leave of absence in the spring of 1949 for domestic reasons. We hoped she might have been able

to return to us in due course, but this was not possible and she finally resigned her post at the end of 1949. Her post has not yet been filled. Mr. L. J. Puleston also left the Section in July for an industrial post. His place was filled in September by Miss W. M. Phillips, who has had previous analytical experience in research laboratories.

A new appointment in this Section, assistant in the fungicide development work, was temporarily filled for six months by Miss V. P. J. Clarke. She was succeeded by Mr. E. L. Frick, who came to us from University College, Aberystwyth, in April.

We congratulate Dr. C. H. Cadman on being elected a Fellow of the Royal Society of Edinburgh in February, 1950.

The work of the Scientific Liaison Section has increased greatly during the past two or three years, and we are glad to report that the Section has been reinforced by the appointment of Mr. E. G. Coker in January. Mr. Coker, who comes from the East Anglian Institute of Agriculture, Writtle, Essex, has already made himself very useful, particularly during the summer months when, as reported elsewhere, we had many visitors to welcome.

When the new virus greenhouses come into full use the area devoted to experimental work under glass will be very nearly doubled. The greenhouses at the Station have been added to gradually over a long period, during which Dr. Massee, as Chairman of the Greenhouse Committee, has watched over their welfare, while Mr. A. Tidy has been mainly responsible for growing the plants to meet research needs. To meet new commitments, it was evident that some reorganization was necessary and we may now report with satisfaction the appointment, in July, of Mr. M. M. Macneill, who had recently graduated from Wye College, as Greenhouse Superintendent. The Committee wishes to place on record its appreciation of Dr. Massee's long and valued services to the Station in this connection, together with those of Mr. Tidy in managing the houses almost single-handed. The Greenhouse Committee has now been reconstituted with Mr. Hoblyn as Chairman. However, much of the day to day administration for which Dr. Massee was previously responsible will now be taken over by Mr. Macneill, who will also share with Mr. Tidy the ever increasing task of actually growing the plants.

Among the assistant (scientific) staff, Miss E. Ironmonger left the Pomology Section in January and Miss M. Topley and Miss G. P. R. Hills both came in April. Miss L. V. Stickings joined the Statistics Section as computer in September. In the Biochemistry Section, Miss C. M. Bennett resigned in March and Misses A. J. White and M. M. Acott in July. Miss K. O. Strowgler was appointed in September and Misses M. E. Jenner and E. M. Price at the beginning of October. Miss H. May left the Entomology Section in September and was replaced by Miss S. O. Philcox. P. Abery left the Plant Protective Chemistry Section in September and S. R. B. Solly and Miss J. I. Brackenbury joined in November and April, respectively. Miss J. C. Irving replaced Miss S. D. J. Humphreys in the Scientific Liaison Section in January. In Scotland, H. A. Bissett left the team at Dundee in February.

The increasing load on the administration due to the great expansion in the research staff and the general widening of the Station's activities has been frequently commented on in these Reports in recent years. It was with gratification, therefore, that we reported last year that there was a prospect of giving some assistance to Mr. Royle. In January, Mr. T. R. Littlehales was appointed as Assistant Secretary. He is already relieving Mr. Royle of many of the day-to-day tasks ; none-the-less we must record that there is still ample to keep both of them very fully occupied.

Among the clerical staff, Misses D. A. Jessup, M. V. Relf and L. Midgley resigned during the year, and Misses D. Clegg, I. Bell, P. Rayfield, K. D. Apps and J. Bates were appointed.

We congratulate Mr. D. Akenhead, Director of the Bureau, on the award of the Order of the British Empire by H.M. the King. Mr. Akenhead, who has been at East Malling since the inception of the Bureau in 1928, is now one of the senior Commonwealth Bureaux Directors and it gives us all great pleasure that his long and devoted service has been recognized. By the time this Report is in print Mr. Akenhead will have left by air for a tour of the Commonwealth lasting several months. We know that the many old friends of the Station and Bureau whom he will meet will give him a warm welcome and we look forward to his return some time next summer.

We congratulate Mr. A. G. G. Hill, Assistant Director of the Bureau since 1947, on his appointment as Director of the Commonwealth Bureau of Pastures and Field Crops, Penglais, Aberystwyth, in November. During his brief stay with us Mr. Hill entered into Station activities and his services as Chairman of the Canteen Advisory Committee were much appreciated, especially during the move to the new canteen. In March, Mr. G. K. Argles returned to the Bureau as Assistant Director after twelve years' absence. It will be recalled that Mrs. Argles (*née* Miss B. Wates), before her marriage, assisted Mr. A. C. Painter, who was then our Marketing Officer.

The Staff of the Bureau was augmented in May by the appointment of Mrs. E. Ulyatt.

Our good wishes go with all those who have left us during the past year, particularly those three who are taking up appointments abroad. Likewise we extend a warm welcome to those who have joined us, wishing them many happy years at East Malling.

The reorganization of the Greenhouse Committee has been mentioned already ; we must also again thank the officers of the Library (Chairman, Mr. Akenhead), Workshops (Chairman, Mr. Villiers), Photographic Studio (Chairman, Dr. Montgomery) and Canteen Advisory (Secretary, Dr. Flood) Committees for their help in administering these activities. A Sub-Committee of the Staff Council, of which Mr. Garner is Secretary, has also given valuable assistance in planning various amenities in connection with the estate.

Social and Athletic Activities.

The East Malling Association repeated its much appreciated grant of £250 for the year towards staff social and athletic activities. This covers part of the cost of the Christmas party and helps towards the upkeep of the cricket pitch—both expensive items. Apart from these, smaller grants to various Clubs have been made. However, the erection in the not too far distant future of a sports pavilion is the ambition of all and Clubs have been as modest as possible in their requests for financial assistance, some of them contributing from their own resources, so as to accumulate as much as possible towards this end.

We should have recorded last year the election by the staff of Miss B. F. Seymour as Social Secretary. Miss Seymour's duties are somewhat vague, but she now plays a most valuable part in co-ordinating our Club activities.

This year we were able to return to the practice of holding the annual party before Christmas and it took place, again on two consecutive nights, in December. The party was held at Bradbourne as before, a somewhat shorter though not less enjoyable variety entertainment, arranged by Miss Seymour, being followed by a dance.

Now that the lawns around Bradbourne have been re-established and the lake refilled, summer gatherings have once more become possible and a most successful, not to say riotous, children's party attended by some eighty children, ranging in age from

one to eighteen, and an unspecified number of parents and helpers, took place on the 26th August. Among many other attractions, despite a high wind, members of the newly formed Boat Club navigated a fleet of three " vessels ", headed by Cockatrice (recently presented to us by Sir Ronald Hatton), on the lake to the vast enjoyment of numerous small passengers.

The Annual Cricket Match against the Members, again captained by Mr. R. D. Wickham, took place on the 29th June, resulting in a win for the visitors. The Club had a good season, making full use of the new ground. Matches were arranged this year against Wye College and the R.H.S. Gardens, Wisley, which we hope will become annual events in the Club's fixture list.

Tennis was handicapped by the poor weather, but the courts were on the whole well used ; six matches were played, three of which were won.

The Table Tennis Club now plays in the new canteen ; they report an increased membership and a highly successful season in which they won eight out of thirteen matches played.

Both the Dance and Gramophone Clubs have benefited from the purchase of a new record player and amplifier. The former organized two dances, in addition to the Christmas party, as the result of the first of which they were able to hand over a substantial donation to the Pavilion Fund. Fourteen gramophone concerts were arranged and an excursion organized, all of which were well attended.

The Play Reading Society, one of the oldest of our social clubs, read six plays at Bradbourne or in members' houses and held their annual Christmas jollification this year in January.

To strike a more solemn note, we may report that the Chess Club continues to meet twice a month and now has eighteen members.

As is fitting at a horticultural research station, many members of staff have gardens of their own. How keen these gardeners are was again evidenced by the 184 entries for the Garden Club's Summer Produce Show. This year numerous entries for a non-competitive handicrafts section were a new indication of the versatility of our staff.

Food parcels continued to arrive throughout the year from our overseas friends at Griffith, New South Wales, and by mid-July some 218 members of staff had benefited. The staff hope shortly to show how much they have valued these gifts in some practical way that will be a reminder in the future of the close friendship between the two Stations during these difficult post-war years.

Candidates for Higher Degrees.

We congratulate two members of the research staff and two postgraduate students on the award of higher degrees by London University :

In January, Mr. Ambika Prasad, postgraduate student from India in the Physiology Section :—Ph.D. degree for thesis entitled " Studies in the propagation of some woody species from cuttings with special reference to the effect of the nutritional status of the host plant ".

In February, Snr. J. Herrero Catalina, postgraduate student from Spain in the Pomology Section :—Ph.D. degree for thesis entitled " Studies of compatible and incompatible graft combinations with special reference to hardy fruit trees ".

In July, Mr. S. C. Pearce, Statistics Section :—Ph.D. degree for thesis entitled " Certain statistical problems arising in the designing and interpreting of experiments with perennial plants ".

In August, Miss Elsie M. Collyer, Entomology Section :—Ph.D. degree for thesis entitled " A study of some predatory insects and mites associated with fruit trees, and their significance in the control of the Fruit Tree Red Spider Mite, (*Metatetranychus ulmi* Koch.) ".

At the end of the year seven members of the research staff and one postgraduate student, Mr. A. Wakil, Afghanistan, were registered with the University for higher degrees.

It is a matter for regret that we can now find room for only very few postgraduates either for long or short term study and are unlikely to be in a position to accommodate more until the laboratory space available can be substantially increased.

Short Term Students and Temporary Recorders.

Despite overcrowding, it was a pleasure to welcome for short periods a few research workers from overseas.

Mr. R. P. Longley of the Kentville Station, Nova Scotia, spent three and a half months in the summer working with the Pomology Section, who also found room for Miss E. Mellemgaard (Denmark) for nine weeks, Messrs. J. Wellejus and S. F. Pedersen, also from Denmark, for about two months each during the summer months, and Mr. R. B. Jackson from Cambridge University for a month in September. It almost goes without saying that Mrs. Swithinbank again helped the Section throughout the year, while Miss R. F. Stern once again devoted part of her vacations to helping the recording staff.

Mr. D. E. Barton, University College, London, stayed a month with the Statistics Section helping with sampling studies.

Professor E. Vieitez (Spain) spent a month in the summer working with the Plant Physiology Section. During the same period Professor R. Dios Vidal of Pontevedra and Professor Rodriguez Munoz of Zaragoza, Spain, both spent a month studying methods in the Biochemistry Section. In the same Section, Mr. P. R. Chadwick assisted for three months in the spectrographic laboratory.

Mr. J. S. Murray, assistant forest pathologist of Farnham, Surrey, spent a month in the early summer in the Pathology Section studying tree viruses. In July, Miss M. M. Ward of the Department of Botany, Oxford, spent a fortnight in the same Section. Both these workers helped materially at busy seasons. Mr. E. J. Calvert of the Ministry of Agriculture, Northern Ireland, also spent a short time in the Section in May studying strawberry virus testing methods.

During August and September two University students spent periods of a fortnight each in the Entomology Section's Field Laboratory at Great Braxted, Essex, helping in the Red Spider Investigations. These were Mr. I. J. Wyatt of Southampton and Mr. F. Newton of Reading.

During the year a scheme was approved by the A.R.C. that enables us to accept a few science students or postgraduates of British nationality as temporary field recorders during the busy seasons, usually the summer vacation. To assist with the cost of maintenance these students receive a small subsistence allowance. Seven University science undergraduates came for a month in the summer under the new scheme.

In the Pomology Section, Miss S. M. Littleboy of St. Hilda's, Oxford, and Miss M. A. Newman of Wye College were here in July, Miss P. B. Webb, Studley College, in August and Miss T. M. Norman, Bristol, in August and September. Also Mr. N. R. Lee, who had recently graduated at University College, North Wales, spent August and

September helping with the general field recording, as a preliminary to the start of a two year postgraduate course in the Section.

Miss J. L. Harmer of Girton College, Cambridge, assisted Miss Bennett on the Pathology Section's field experiments in August and September, and Mr. G. H. Jenner, King's College, London, helped in the Plant Protective Chemistry Section.

In Scotland, Mr. R. A. Kennedy of University College, Dundee, worked from June to September as a plantation assistant with the Raspberry Investigation.

Plantation Assistants.

The team is now made up of five girls and three men. This year set periods have been spent in the packing shed, grading and packing fruit under the supervision of the packhouse foreman.

Visits were paid during the year to the R.H.S. Chelsea Show, Kent County Soft Fruit Show and the Marden Fruit Show, and also to Messrs. Seabrook's Nurseries.

We congratulate J. Ware and Miss A. Rake, the latter of whom is now teaching at Wye College, on passing their N.D.H. Final examination.

Of those who have completed the course since October, 1949, M. Watson, C. Spiller, J. Ware, L. J. Dupuy and C. Simmonds are now working in commercial fruit-growing. R. Abel-Smith has been given the post of assistant nursery manager in the fruit department of Messrs. Bee's Nurseries at Chester. M. Bamborough is growing rubber for Messrs. Dunlop in Malaya. D. Johnstone has left to start up on his own fruit farm in Kent.

Staff Discussions.

Eight Staff Discussions were held from November to March. Alternate meetings were devoted to reviews of the programmes of various Sections and talks by individual members of staff on visits they had paid to foreign research stations.

The research programme discussions were introduced by the Head of a Section followed by contributions from other members on certain branches of the research being followed. Emphasis was placed on the inter-relationship of the research projects of the various Sections and in the discussions which followed full opportunity was taken for an interchange of ideas on a broad basis.

The talks on visits abroad included descriptions of trips to Switzerland, Czechoslovakia, Holland and France. The different methods of research employed in these countries and their bearing on work at East Malling were very interesting. The visits had evidently proved valuable and very full discussions ensued.

One very informative discussion was held on the techniques of lecturing and of writing papers for presentation in scientific publications. Contributions were made by the Director, Dr. Cheesman, Mr. Akenhead and other members of staff.

Research Tours.

During July, prior to and following the International Botanical Congress in Stockholm, Dr. R. V. Harris toured fruit-growing districts in Norway, Sweden and Denmark with the special object of studying the incidence of virus diseases. Later, during August, Dr. Harris spent a week in Holland as the guest of the Institute for Phytopathological Research, Wageningen.

In connection with the Congress of Soil Science, Amsterdam, Dr. W. S. Rogers was enabled to pay short visits to Groningen and Wageningen to discuss soil moisture and root growth relationships and other pomological matters.

Earlier in the year, in April, Miss E. M. Glenn visited the Isère region, near Grenoble, to make a special study of methods of walnut propagation by grafting and the conditions under which it is done in this part of France.

With the exception of Dr. Harris' visit to Holland all these tours were made with the assistance of Agricultural Research Council travelling fellowships.

Collaboration.

Perhaps the most significant event of the year in the field of collaborative research between Stations interested in horticulture has been the establishment of the first of the N.A.A.S. Horticultural Experiment Stations at Luddington, Warwickshire. These Stations will carry out experiments on fruit, vegetables and flowers, and, for the first, a Fruit Working Party has been set up representing Long Ashton, John Innes, the National Fruit Trials, the National Institute of Agricultural Engineering and ourselves. The task of the Working Party was to draw up a programme of fruit experiments at the new Stations to cover the needs of the Research Stations for extension experiments in these areas, having particular regard to matters of local interest. For the present much of the work of implementing the programme which has been approved is falling on East Malling, in collaboration with the Director of the Experiment Station ; and, while we hope that in due course special staff will take over the responsibility for the design and conduct of the trials, we look forward to many opportunities for collaboration at these Stations.

Before proceeding to instances of collaboration between individual Sections and other Institutes, we must express our appreciation of the help we have received this year from the Ministry of Agriculture's Survey Section. Mr. G. E. Smith of that Section has recently completed a large scale map of the whole Station that will be exceedingly valuable to us all, both for the accurate measurement of areas of fields and plantations and in the siting of future experiments. A research farm such as ours will depend more and more in the future, as experiment succeeds experiment, on the accurate determination of the position of every tree or bush ; with this new large scale map this should now be possible.

The three long standing major collaborative enterprises have continued during the year. It is now thirty years since we were able to report " Dr. R. C. Knight of the Physiological Department of the Imperial College of Science is now giving his undivided attention to the problems raised by the Root Stock question at East Malling " (E.M.R.S. Rep. 1920-21). To-day there are seven members of Professor Gregory's research staff working with the Plant Physiology and Biochemistry Sections.

Eight years ago we recorded the start of the A.R.C. Scottish Raspberry Investigation, with headquarters at University College, Dundee, and we again acknowledge our indebtedness to the various authorities in Scotland, whose help has made this work possible. Probably during the coming year the team will be absorbed into the new Scottish Research Station under the Department of Agriculture for Scotland, but we nevertheless expect that our close connection with the work, particularly on pathology, will be maintained for many years to come.

The A.R.C. Red Spider Investigations with headquarters at the Field Laboratory at Great Braxted, Essex, have now continued for seven seasons and again we thank the

Pettar Society, the Associated Fruit Growers of Essex and also the East Anglian Institute of Agriculture, Writtle, for many facilities placed at our disposal.

We should like to make special mention this year of a visit of many members of our research staff to Wye and a return visit here from the staff of the College. Already we have many interests in common with members of the Wye staff, for example, in this particular year, Professor Wain has supplied us with numerous growth substances for our frost work, while Dr. S. O. Dark is collaborating with Dr. Keyworth in a new project for breeding hops resistant to Verticillium Wilt. We hope that a more intimate knowledge of the work in progress at the two Institutes will enable us to assist each other further in future years.

Apart from the Experiment Stations, we have continued to come into contact with N.A.A.S. officers in many projects. In the South-Eastern Province we may list such diverse subjects as soil sampling and soil structure determinations, a trial of gooseberry cuttings, soft fruit virus diseases, the control of Brown Rot of apples and the mycological and bacteriological aspects of the work at the Botley Station on the Black Root Rot of strawberry.

With the West Midlands Province we should mention designs for projected large scale trials with cider apples and the use of resistant stembuilders for the control of Bacterial Canker of plums.

Numerous other examples could be cited of the benefits accruing from our close contacts with N.A.A.S. Horticultural Officers, while we should also mention our concern with the Ministry of Agriculture's various certification schemes for fruit tree rootstocks, small fruits and hops and with scientific aspects of the Verticillium Wilt of Hops Order 1948.

We have continued to supply fruit for various research purposes to the Ditton Laboratory and collaborative studies are in progress on the maturity of Cox's Orange Pippin pollinated by different pollens, the best method of keeping late varieties, such as Tydeman's Late Orange, and on the effects of delay in picking and of NAA spray applications on the behaviour of Cox's Orange Pippin and Bramley's Seedling apples in cold store.

The joint Pomology-Physiology experiment on rooting of cuttings with the Nursery Research Station, Boskoop, initiated last year, has continued ; also in Holland, collaborative work on fruit viruses has been initiated with the Institute for Plant Diseases Research, Wageningen.

In frost research we continue to collaborate with the National Institute of Agricultural Engineering on matters of mutual interest.

In addition to the N.A.A.S. at Wye, workers at Rothamsted have continued to help us with analyses of soil samples, while the Department of Agriculture, Oxford, has advised us and supplied materials for weed-killer trials. A disease of subterranean clover found on one of our cover crop plots is being examined by Dr. F. J. Moore of the Ministry of Agriculture's Plant Pathology Laboratory, Harpenden. We have co-operated in raspberry variety trials in Northern Ireland and Cornwall.

We have supplied soft fruits for canning and jamming tests to the British Food Manufacturing Industries Research Association ; apple rootstocks to Mr. P. J. Wareing of Bedford College for photoperiodism studies ; and material for respiration research on apple roots to Dr. E. J. Maskell of Cambridge. We have continued to assist Mrs. M. E. Scholes in a study of onion root mitosis.

Through the courtesy of the Director of Rothamsted, Dr. Pearce was enabled to spend a month in the Institute of Statistics, bringing himself up to date with the work in

progress and statistical methods in use there. The collaboration of our Biochemistry Section with the Research Laboratory of Messrs. Metropolitan-Vickers on the application of the mass spectrometer to the mineral analysis of plants has been continued.

In the Pathology Section Dr. Moore has collaborated with Messrs. Pest Control, Ltd. in the spraying of atomized lime-sulphur concentrate by helicopter. In the School of Biochemistry, Cambridge, Miss B. Mills has worked with us on the pectic enzymes excreted by the pathogens of Bacterial Canker of stone fruits. Hop Nettlehead experiments have been carried out with Mr. J. E. Wilson of Messrs. Guinness, Son & Co.

Mr. Crosse and Dr. Pitcher have consulted Dr. M. S. Lacey of the Imperial College concerning techniques for use with *Corynebacterium fascians*, an organism associated with the Cauliflower disease of strawberry. We have provided her with field material in exchange for cultures of the organism.

The Entomology Section acknowledge the help received from the Nematology Department at Rothamsted, and from Mr. L. N. Staniland in the strawberry eelworm investigations. Drs. A. B. Page and O. Lubatti of the Imperial College again collaborated with them in the control of Tarsonemid Mite by methyl bromide.

The Plant Protective Chemistry Section have received chemicals from the Inter-Departmental Committee on Insecticides, Fungicides and Herbicides, Dr. H. Martin of Long Ashton, Dr. B. A. Kilby of Leeds, Dr. P. W. Brian and Dr. J. C. McGowan of Welwyn and several commercial concerns.

The Scottish Raspberry team report experiments on the effect of virus infection on vigour, cropping and nutritional status of Lloyd George with the Macauley Institute for Soil Research and on the effect of environmental conditions on the expression of Norfolk Giant Leaf Curl disease with Dr. I. W. Prentice of the Plant Pathology Laboratory, Harpenden, and Mr. D. M. Henderson of the D.O.A.S. Plant Pathology Station, Edinburgh.

We trust that we have noted here the majority of the projects in which we collaborate with others ; if not we apologize. We value these outside contacts very much and hope they will continue to expand.

Outside Trials.

The possibilities for future extension trials offered by the new N.A.A.S. Horticultural Experiment Stations will not by any means obviate the need to pursue our researches into growers' plantations, especially where problems have to be solved that are peculiar to certain localities, e.g. the occurrence of a particular pest or a mineral deficiency. The co-operation of Members of the Association in bringing such problems to our notice and offering facilities for trial is much appreciated.

For some years our Chairman has given a lead and we still have a number of trials on his farms, particularly at Throwley where, incidentally, there is now a sub-station maintaining weather records under the Agricultural Meteorological Scheme.

The Chairman of Finance, Mr. J. W. S. Mount, has also helped us and we now have two trials, one on the control of biennial bearing by defoliation sprays, and another on mineral deficiency, on his farm at Canterbury.

The trials of apples on various rootstocks on different soil types have been continued and on one of them, at Bredgar, wind records are being maintained for us, a very valuable record on this exposed hill-top site. Various growers in many parts of the country have been testing our new apple and raspberry varieties and we are grateful for their reports

on their suitability or otherwise for their conditions. Contact has also been maintained with growers who have strawberry runner nurseries.

The Pathology Section still has many outside trials, particularly in relation to Verticillium Wilt and Nettlehead of hops. With the assistance of the N.A.A.S., observations are being carried out in relation to strawberry virus diseases on two farms where there are special stock nurseries. A spraying trial on the control of Bacterial Canker of cherries has been started on a farm at West Malling. In the Essex Red Spider trials, there have been trials on six farms on the control of the pest and in connection with the life history and predator studies, conducted by the Entomology and Plant Protective Chemistry Sections. We should acknowledge particularly the facilities afforded us at Porter's Farm, Great Braxted, where the Field Laboratory is, by Mr. C. L. Brock.

The Scottish Raspberry Investigation relies entirely upon interested growers for field trial and propagation facilities. Two variety trials are in progress at Slatefield, Forfar, and Pathhead, Kirriemuir. At the first of these, there is also a pilot trial of atomized, concentrated lime-sulphur for control of the Cane Spot disease.

The propagation of virus-tested raspberry stocks is being carried out at selected farms by arrangement with seven different owners. Trial plots of new seedlings are also being maintained at Carslogie, Cupar, and Kirkfieldbank, Lanark.

We once again assure these growers of our appreciation of the facilities they give. As long as this kind of activity is continued and fostered, with the assistance of our Members, there need be no fear that research workers will become separated from the interests and problems of the fruit-growing industry.

Committee Work and Conferences.

The number of outside committees relating to research, education and advisory work in horticulture on which members of staff serve is now forty-nine. These committees, valuable as the work is, add considerably to the calls on the time, particularly of senior members of the research staff. More than a quarter of these committees are connected with the affairs of the National Agricultural Advisory Service, including now the various advisory committees in connection with the Horticultural Experiment Stations already referred to. This year also a new committee has been set up in connection with the Scottish Nuclear Stock Organization, under the Department of Agriculture for Scotland, on which the Director and Dr. Cadman have been invited to serve. The Director now represents the Station on the Wye College Governing Body and on the University of London Boards of Studies for Agriculture and Horticulture, and for Botany.

The past year has included two important international events, the 7th International Botanical Congress, at Stockholm in July and the 5th International Congress of Soil Science, at Amsterdam, also in July; the Station was represented at both and Dr. R. V. Harris read a paper on Raspberry Viruses at the Botanical Congress.

A very successful two-day conference of workers from official institutions in this country, concerned with the development and use of insecticides and fungicides, was held in March. Demonstrations were given by the Plant Protective Chemistry, Entomology and Plant Pathology Sections, and an informal discussion was held at the Royal Star Hotel, Maidstone, during the evening.

Mr. A. C. Mason demonstrated his micro-nephelometer at the Physical Methods Group of the Society of Public Analysts and other Analytical Chemists.

Dr. R. S. Pitcher read a paper on " The Raspberry Cane Midge " and Dr. M. C. Vyvyan a paper on " Fruit Drop and its Control " at the British Association Meeting held at Birmingham in September.

Dr. C. H. Cadman contributed a paper to a symposium on " Potato and Fruit Crops in Scotland in Health and Disease " held by the N.A.A.S. Plant Pathologists and the Association of Applied Biology in Edinburgh in July. An exhibit was staged at the Conversazione and a party of the visitors entertained by the Raspberry Investigation team at University College, Dundee, by kind permission of Principal Wimberley and the Council of the University.

The Station has been represented at many other conferences of fellow scientists, advisers and fruit-growers, and in many cases contributions were made to the discussions.

Advisory Work.

Correspondence.

There has been a further slight reduction in the number of letters seeking advice received during the past year, and the number passed on direct to the advisory services was considerably lower. The number replied to by the Scientific Liaison Section remained at about 1,500, of which some 135 were subsequently passed on to the advisory services for further action. Some 700 letters were answered personally by individual research workers and many of these letters were from specialist advisory officers or were of direct assistance to the progress of particular lines of work. It would seem that growers are becoming more familiar with the type of enquiry that should go direct to the advisory services and a larger part of those reaching the Station are such as only workers at the Station can answer. The telephone is still frequently used for making enquiries for routine advice, doubtless because there is usually someone available who can give an answer to an urgent question.

Visits.

Visits during the year totalled 229; of these some 70 were paid by the entomologists, mainly in connection with research on the Fruit Tree Red Spider, about 50 were concerned with raspberry troubles in Scotland, and some 44 in connection with virus diseases of tree fruits and hops. Frequently these visits were made in company with the appropriate advisory officer.

Exhibits.

Exhibits dealing with the work of the Station were staged at ten centres in the South Eastern counties. The most important of these showed some of the insects that are predatory on the Fruit Tree Red Spider Mite. This exhibit was prepared for the Chelsea Flower Show and was subsequently displayed at three other centres. The Station contributed a section on frost and fruit-growing at the Meteorological Centenary Exhibit at the Science Museum. Other subjects exhibited during the year were fruit injuries and their causes, the diagnosis and cure of iron deficiency, points in exhibiting fruit, and the Spray Programme. Material was loaned and assistance given to several county advisers and horticultural societies in preparing their own exhibits.

Visitors.

Although the total number of visitors, 2,960, showed a slight reduction over the exceptionally high figure for last year, extra work in connection with the British Council Pomology Course more than compensated. This Course was attended by fifteen graduate research workers in pomology from Finland, Norway, Sweden, Denmark, Belgium, France, Switzerland and Italy and lasted for ten days. It consisted of lectures by members of the research staff and tours of the plantations, as well as a visit to Wye College and the fruit farms of Mr. J. W. S. Mount and Mr. T. Neame. The friendships made during the course should prove mutually helpful in the years to come.

In all sixty-three parties of visitors totalling 1,650 persons were shown round the plantations and the laboratories. We were especially pleased to be visited by the Commonwealth Agricultural Bureaux Review Party, the staff and postgraduate students of Wye College, the Royal Institute of Chemists, the South Eastern Branch of the Horticultural Education Association and a party of French technical experts led by Commandant Cochois. Other parties included the Association of British Organic Fertilizers, Horticultural Officers from the Republic of Ireland, two parties of American students arranged by the National Union of Students and students from eight colleges in this country and the Norwegian College of Agriculture. In addition to these, in June the Station was opened to local people on a Saturday afternoon and attracted some 325 visitors, who were taken in small parties on a special tour of the plantations and laboratories to acquaint them with the sort of work done at the Station. Saturday afternoons during the summer months continue to be popular with societies and groups that cannot arrange to visit on a normal working day.

Individual visitors numbered 720 ; of these 245 came from overseas. Many of these were research workers and some paid visits lasting several days ; their programmes required special care to ensure that each saw the particular aspects of the work in which he was most interested and met the workers concerned without unduly interfering with the research in progress. We regard these contacts with our colleagues from other countries as particularly valuable. It was most gratifying that the new Secretary of the A.R.C., Dr. W. K. Slater, was able to spend two days at the Station, discussing in considerable detail various lines of research with the individual workers concerned.

Members of staff of the official advisory services and educational institutes have been invited to attend the rehearsals which preceded our Members' Days on growth substances, cover crops and biennial bearing, and codling moth and brown rot ; in all a total of some 164 officers were present at these meetings. They were also invited to join in the special programme that preceded the Amos Memorial lecture and many were able to attend. The second party of a third of the horticultural staff of the N.A.A.S. paid a two-day visit to the Station in July and on this occasion the Senior Horticultural Officer, Mr. C. E. Hudson, was among the fifty officers who attended. These visits are proving a valuable medium for joint discussions and assist in developing and maintaining personal relations between the research worker and advisory officer.

Attendances at Members' Days, not included in the figures given above, amounted to 900.

Lectures and Demonstrations.

Thirty-two lectures have been given by members of staff to growers and students. While the majority of these were naturally in Kent and counties adjoining Kent, lectures were given as far afield as Cambridge, Ipswich, Lincoln, Aylesbury, Norfolk and Dublin.

Dr. Roach gave a series of three lectures on mineral deficiencies at Copenhagen by arrangement with the British Council. A fifteen-minute talk on recent research at the Station was given on the B.B.C. Home Service in the " Farming To-day " programme in February. Photographs, lantern slides and films have been lent to advisory officers and educationists to supplement their lectures.

In addition to the many demonstrations of work at the Station, strawberries showing symptoms of attack by various eelworms were shown to N.A.A.S. officers at meetings at Wisley and Sutton Bonington in connection with inspection for certification. In Scotland the raspberry variety trial, run by the Scottish Raspberry Investigation, was open to local growers in July, by kind permission of Messrs. Morrison Bros.

The usual refresher courses were held at the Station for N.A.A.S. officers about to undertake the inspection of fruit tree rootstocks and hops.

Several members of staff served as judges at the chief commercial and amateur fruit shows in Kent and London, and one judged at the Royal Dublin Society's Apple Show in Dublin.

Distribution of Rootstocks and Experimental Material.

Distribution.

Heavy demand was again experienced for nursery material in 1949-50 and only in two instances was there a surplus.

Lifting of material for distribution commenced mid-November and was completed in the last of the stoolbeds by the 24th December. During this period fine weather was experienced, helping considerably with this work. Despatching commenced in the first week of January and the main bulk of material was despatched by the first week of February. Only the late delivery requests and overseas orders were left to be completed soon after.

Rather more postal packages were completed this season ; just over 200. These were mainly Tydeman's Late Orange graftwood and one-year-old bushes of the new late blackcurrant, Amos Black, when only one or both of these new varieties were required from the distribution list. Bundles sent per passenger train amounted to just over 600. Road collections were also frequent and several large quantities were removed by this method towards the end of the season.

The total amount of material sent out, including all allocations to Fellows, Members, Educational and Trade establishments, together with the surplus, was approximately as follows :

Rootstocks, 154,700 apple, 69,000 quince, 40,100 plum and 18,600 cherry of all grades.

Fruit Trees, 956 apple, 570 pear, 29 plum, 44 cherry, 45 walnut, 74 peach, and 2,768 assorted trees which were disposed of late.

Soft Fruits, 42,500 strawberry runners, 10,600 blackcurrant bushes, including Amos Black, 440 loganberry one-year bedded plants, and 813 Black/Red hybrid raspberry canes.

In addition research material both for our own requirements and for other Stations was supplied as follows :

Rootstocks, 12,945 apple, 2,966 quince, 2,006 plum, 1,125 cherry

Fruit Trees, 1,742 apple, 656 pear, 305 plum, cherry, peach and apricot together.

Soft Fruits, 158 blackcurrant and gooseberry bushes and 200 strawberry plants, apart from those supplied specially by the Pomology Section.

All apple trees and apple rootstocks liable to attack by Woolly Aphid (*Eriosoma lanigerum*, Hanson) were fumigated with cyanide and all rootstocks dipped in a 5 per cent concentration of tar oil to kill aphid eggs.

Planting.

Further planting has taken place in the new blocks of the Woolly Aphid Resistant apple rootstock stoolbed and most are now completed. In addition small quantities of the commercial range of rootstocks, have also been planted alongside to supply sufficient material for research and educational requirements when the larger beds now in use have been superseded. The extra planting together with the nursery material lined out for budding caused a heavy drain on labour. Fortunately, in the later planting of bedded stocks, the now perfected stock planting machine, greatly helped to reduce labour. With this machine it is now possible to plant 25,000 of the lower grades of stocks per day for the next year's crop of bedded rootstocks.

Season 1950.

For the nursery this has been good, apart from the dry, windy weather early in the season. Unfortunately the winds caused considerable drying out of the cutting beds and excessive loss of moisture by transpiration. The nursery in general has grown well and good material is likely to be available in 1950-51 for experimental plantings and distribution. The loganberry propagation stock plants thrived under the later wet conditions and an excellent crop of young plants has been produced.

Weeds have also grown well and sometimes hand weeding the larger ones, leaving them heaped up, has proved a cheaper and better method for destroying them than continual hoeing.

Pests and Diseases.

These have been few, but Mildew (*Podosphæra leucotricha*, Ell. and Everh.) has been prevalent in spite of several sprayings.

New Varieties.

Owing to the heavy demand for graftwood of Tydeman's Late Orange apple in 1949-50, it has been decided to offer material for a second year in succession.

Also, since we were unable to supply so many who applied for the new blackcurrant Amos Black last year, bushes are again being offered in 1950-51, but not, we fear, sufficient to satisfy the heavy demand even then.

STATION'S PUBLICATIONS.

Part II of the Research Report contains a full list of publications during the year ; in all 37 scientific papers and 25 more popular articles were published. Constant assistance has been given to the N.A.A.S. and the Department of Agriculture for Scotland in the preparation and revision of the official fruit bulletins and advisory leaflets.

Journal of Horticultural Science.

At a meeting of the Publication Committee in March, Dr. E. E. Cheesman tendered his resignation as Joint Editor and Mr. T. N. Hoblyn was appointed in his place.

During his tenure of office, in addition to normal editorial duties, Dr. Cheesman had found time to prepare an Index of Volumes XI to XX which is due to appear shortly. We are glad to report that he will continue his association with the Journal as a Member of the Publication Committee.

The final number of Volume XXV, due to appear in June, 1950, was not in fact published until September, so that the aim to produce one volume in each calendar year is still far from attainment. The flow of manuscript is still rather spasmodic, and it has taken more than a year to collect sufficient material for Volume XXVI. Again, however, more than half the papers in this Volume will be contributed from sources other than Long Ashton and East Malling.

LIBRARY COMMITTEE.

The shelving situation was eased during the year by the acquisition of 273 feet in steel. A re-arrangement of existing shelving and furniture was necessary to fit the new shelving into the room occupied by the library, with the result that, though the storage space has been increased, a certain amount of daylight has had to be sacrificed. The new shelving at the present rate of intake of the joint libraries will probably be adequate for the next four years, after which the whole problem of library accommodation will become acute, as it is difficult to see how further shelving can be installed without more floor space.

Dr. H. Wormald has presented his extensive collection of pamphlets, including some books and journals, to the library. This collection should prove of great interest as it contains early material published before the library was founded. The library is also, as last year, indebted to the British National Book Centre, through whom many useful gifts of journals have been made. Other donors of welcome material have been : R. Barrington Brock, Esq., the Central Library for Animal Diseases, Chilean Iodine Educational Bureau, Dr. W. Eggenberger, Miss E. M. Glenn, Dr. A. H. M. Kirby, Mr. A. C. Mason, Ministry of Agriculture and Fisheries, Messrs. Murphy & Son, Ltd., Nitrate Corporation of Chile, Ltd., Dr. S. C. Pearce, Dr. R. S. Pitcher, Dr. W. S. Rogers, Science Museum Library, and Dr. I. Thomas.

The use made of the library during the year is partly shown by the figure of 2,327 items borrowed, made up of 449 books, 485 bound journals, 601 unbound parts, and 792 pamphlets. Under the arrangements for automatic circulation of selected journals, 466 individual items were circulated during the year. In addition 224 publications were borrowed from other libraries on direct request or through the National Central and Science Museum Libraries, and 297 publications were loaned from this library on the same lines.

Forty-three books, 1,148 pamphlets, and 130 bound journals were added to the library during the year, as well as numerous annual reports and unbound issues.

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